

In the Matter of)
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Revision of Part 15 of the Commission's Rules) ET Docket No. 13-49
To Permit Unlicensed Information Infrastructure) (U-NII) Devices in the 5 GHz Band
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To: The Commission

The Delaware Department of Transportation (DelDOT) pursuant to Section 1.415 of the Commission's Rules, 47 C.F.R. §1.415, hereby respectfully submits their Reply Comments in response to the Notice of Proposed Rulemaking ("*NPRM*") in the above-captioned proceeding. The DelDOT engineering staff have reviewed the comments and presentations filed in response to the NPRM. Based on our analysis of the filings on record, we have prepared a statement of reply comments and suggestions to the proceeding.

DeIDOT has recently completed a comprehensive Telecommunications Master Plan to define the architecture for a statewide broadband network to support the implementation of distributed Intelligent Transportation System (ITS) technology. The State's broadband network will provide a high-speed conduit for interconnecting thousands of ITS devices to the central control and monitoring center in Smyrna, Delaware.

The network is comprised of a multi-ring high-capacity broadband fiber-optic infrastructure that will directly interconnect all existing and future ITS devices and traffic signals. Today there are a total of 1750 ITS devices directly attached to the network. It is anticipated that in the next decade, another 680 devices will be installed. In planning the network's long-term requirements, our staff is anticipating that most of the ITS locations will serve as points of installation and interconnection of dedicated short-range communications (DSRC) fixed-facility network access units. The DelDOT backbone network will thus serve as a statewide conduit to interface motorists with connected vehicles technology to real-time traffic information germane to their specific location and direction of travel and will allow vehicles to directly interact with traffic signals, ITS devices, and other roadside equipment. In addition to provide the transport link to link the State's TMS to the DSRC field access unit, the backbone network will support the network-wide monitoring capability for 24/7 oversight of the infield DSRC hardware.

The DelDOT Telecommunications Master Plan specifies that all ITS field location sites will be connected to the backbone network by either fiber-optic feeder cabling or short-range broadband point-to-multi-point wireless technology. In developing the Telecommunications Master Plan, DelDOT has closely followed this proceeding and focused specifically on comments submitted by the American Association of State Highway and Transportation Officials (AASHTO) throughout the process.

We noted that AASHTO has provided substantive engineering RF propagation studies defining, under a variety specific scenarios, how sharing of spectrum with unlicensed operators might adversely impact both the functionality and reliability of area-wide DSRC deployment.

Based on the engineering exhibited in the previous AASHTO submissions, our

telecommunications engineering team has examined the potential impact of unlicensed use of the spectrum currently allocated to support DSRC applications.

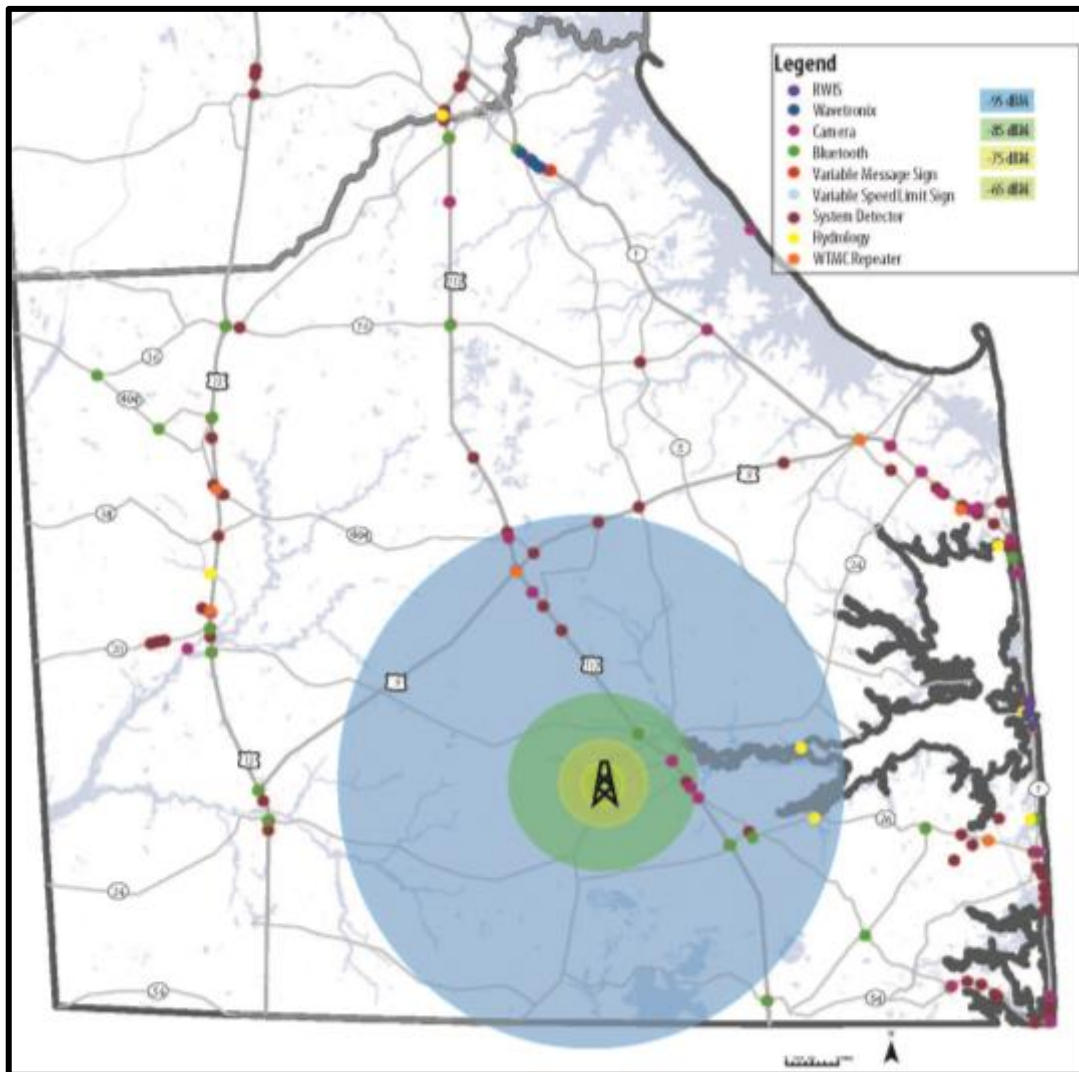
II. Real-World Barriers to Sharing DSRC Spectrum with Wireless ISPs

In our review of the AASHTO comment submissions, we found the issue of shared spectrum with wireless Internet providers to be the most challenging for our own statewide deployment. Much of central and southern Delaware is rural in nature, exhibiting generally relatively flat terrain—an environment that supports extended RF propagation in the near line of sight 5 GHz spectrum. Much of the area is rural farmland, exhibiting low population density. Low-cost, consumer-focused, high-speed Internet service is in many locations only available through satellite providers. Telco and cable terrestrial carriers and cellular services generally focus on larger, higher-population-density areas. Wireless Internet service providers (WISP) are often a viable option. Under the current FCC rules in place for unlicensed operation, ISPs can install high-capacity point-to-multipoint wireless networks to serve this rural market.

In our search of the FCC tower database, we found WISP operators operating on towers at heights in excess of 300 feet above ground. As an example, we examined the signal propagation of a hypothetical unlicensed WISP operating with an ERP of 4 Watts pursuant to current FCC regulations. The coverage exhibit is computed based on the Longley-Rice irregular terrain model (ITM) of signal intensity coverage from an existing WISP tower location near Millsboro, Delaware. The signal level coverage map below illustrates the extent of propagation for 5 GHz wireless technology for service coverage of signals -95 DBM or greater. For this example, it is assumed that the receiving antenna has a gain of at least 8 dB and is mounted 15 feet above ground. We consider this to be a reasonable assumption based on the configuration of

wireless equipment being used by the local DOT to support vehicle-to-infrastructure (V2I) communications and the mounting infrastructure available for placing devices in the field.

The propagation map reveals that from this site, the hypothetical WISP would impact or inhibit proper operation in an area of over 280 square miles. Note that on the map there are a total of 20 existing network-connected ITS/traffic signal devices that would receive signals from the offending unlicensed facility equal to or greater than the -95 dBm and interference protection level that both the FCC Tiger team and AASHTO targeted. Further, there are 15 additional ITS devices target for deployment in the future.



Note that this is not a unique situation, it is reasonable to assume that consumer demand for rural high speed internet will fuel expanded wireless deployments statewide, negatively impacting future DSRC.

III. Summary

DelDOT sees great potential in the deployment of real-time information to the traveling public. Reliable communications will be a keystone of public acceptance. The U.S. Department of Transportation and AASHTO have been diligent in their efforts to define and focus the path of deployment of DSRC in the 5.850 GHz to 5.925 GHz band. Much of the overall plan has been predicated on developing a system-wide high-availability mobile conductivity link to support V2V and V2I applications. It is our view that any sharing of this reserved spectrum on a large-scale basis must be preceded by a rigorous analysis of the impact of the shared operation on the successful deployment of DSRC. Prior to implementation, field testing should be conducted to validate the analytical models. Finally, based on DelDOT internal review, we recommend that a practical limitation of height above average terrain (HAAT) be placed on unlicensed users in the DSRC band.

Respectfully submitted,

Delaware Department of Transportation

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